

IN THE CLAIMS:

Rewrite the pending claims as follows:

1-22. (Canceled)

23. (Currently amended) ~~The system of claim 15,~~ A positioning system, comprising:
a passive, isotropic reflecting landmark at a fixed position; and
a device configured to transmit an electromagnetic pulse, the pulse having a
polarization; the device further configured to receive a return signal over a period of time, the
return signal including a reflected pulse from the landmark, and to process the return signal
so as to isolate the reflected pulse from the return signal and to determine a range from the
device to the reflecting landmark;

the reflecting landmark comprising:

a first passive reflector for reflecting electromagnetic pulses;

a second passive reflector for reflecting electromagnetic pulses; and

a static structure configured to statically position the second passive reflector

at an angle relative to the first passive reflector, wherein the angle is about 90°;

the device including

a data processor;

at least one program module, executed by the data processor, the at least one
program module containing instructions for:

transmitting the pulse multiple times, each transmission of the pulse
having a respective transmission beam pattern with a null over a different respective range of
angles;

determining from the return signals from the multiple pulse
transmissions a first set of range candidates, each range candidate representing a possible
range to the landmark, each range candidate having an associated range of angles; and

analyzing the range of angles associated with each range candidate to
produce a reduced set of range candidates that are consistent with one or more potential
landmark positions.

24. (Original) The system of claim 23, wherein the null in the respective transmission beam pattern is less than 15° wide.

25. (Original) The system of claim 23, wherein the device includes at least two antennas driven by substantially identical signals having a phase difference, the phase difference controlling the range of angles of the null.

26-31. (Cancelled)

32. (New) A positioning system, comprising
a passive, isotropic reflecting landmark at a fixed position;
a device configured to transmit an electromagnetic pulse, the pulse having a polarization; the device further configured to preferentially receive a return signal having the polarization over a period of time, the return signal including a reflected pulse from the reflecting landmark, and to process the return signal so as to isolate the reflected pulse from the return signal and to determine a range from the device to the reflecting landmark;

the reflecting landmark comprising:

a first passive reflector for reflecting electromagnetic pulses;

a second passive reflector for reflecting electromagnetic pulses; and

a static structure configured to statically position the second passive reflector at an angle relative to the first passive reflector, wherein the angle is about 90°;

a vehicle locomotion mechanism for moving the device in a particular direction, at a velocity;

a data processor, and;

at least one program module, executed by the data processor, the at least one program module containing instructions for:

transmitting the pulse at a first position of the device and determining from the received return signal a first set of range candidates, each range candidate representing a possible range to the reflecting landmark;

transmitting the pulse at a second position of the device and determining from the received return signal a second set of range candidates; and

processing the first and second sets of range candidates to produce a reduced set of range candidates that are consistent with one or more potential reflecting landmark positions.

33. (New) The system of claim 32, wherein the polarization is a circular polarization.

34. (New) The system of claim 32, wherein the polarization is selected from the group consisting of right-hand circular polarization (RHCP) and left-hand circular polarization (LHCP).

35. (New) The system of claim 32, wherein the device includes at least one antenna configured to preferentially receive signals having the polarization.

36. (New) The system of claim 32, wherein the device includes at least one antenna configured to both preferentially transmit the pulse having the polarization and to preferentially receive signals having the polarization.

37. (New) The system of claim 32,
the at least one program module including instructions for:
detecting a Doppler shift in the reflected pulse portion of the return signal; and
determining an angle between the particular direction and a straight line
between the device and the reflecting landmark.

38. (New) The system of claim 32,
the at least one program module including instructions for:
transmitting the pulse at a plurality of additional positions of the device and
determining from the received return signal a plurality of additional sets of range candidates;
processing the first and additional sets of range candidates to produce a single
range candidate corresponding to the reflecting landmark.

39. (New) The system of claim 32,

the at least one program module including instructions for:

- transmitting the pulse multiple times, each transmission of the pulse having a respective transmission beam pattern with a null over a different respective range of angles;
- determining from the return signals from the multiple pulse transmissions a third set of range candidates, each range candidate representing a possible range to the reflecting landmark, each range candidate having an associated range of angles; and
- analyzing the range of angles associated with each range candidate to produce a reduced set of range candidates, comprising said first set of range candidates, that are consistent with one or more potential reflecting landmark positions.

40. (New) The system of claim 39, wherein the null in the respective transmission beam pattern is less than 15° wide.

41. (New) The system of claim 39, wherein the device includes at least two antennas driven by substantially identical signals having a phase difference, the phase difference controlling the range of angles of the null.

42. (New) The system of claim 32,

the at least one program module including instructions for:

- transmitting a series of pulses;
- generating from the return signals from the multiple pulse transmissions a series of received pulse data sets corresponding to at least a subset of the received pulses, each received pulse data set having received pulse data from two or more of the plurality of distinct locations;
- combining the pulse data within each pulse data set to produce a combined return signal having a receive pattern null in an associated range of angles;
- determining from the combined return signals a third set of range candidates, each range candidate representing a possible range to the reflecting landmark, and
- determining for each range candidate angle-related signal strength data comprising a plurality of amplitude values associated with a respective plurality of angle ranges; and

analyzing the angle-related signal strength data associated with at least one of the range candidates to produce said reduced set of range candidates that are consistent with one or more potential reflecting landmark positions.

43. (New) The system of claim 32,
the at least one program module including instructions for:
transmitting a series of pulses;
generating from the return signals from the multiple pulse transmissions a series of received pulse data sets corresponding to at least a subset of the received pulses, each received pulse data set having received pulse data from two or more of the plurality of distinct locations;
combining the received pulse data multiple times, using a plurality of phase offsets, to produce multiple combined return signals, each having a receive pattern null in an associated range of angles;
determining from the combined return signals a third set of range candidates, each range candidate representing a possible range to the reflecting landmark, and
determining for each range candidate angle-related signal strength data comprising a plurality of amplitude values associated with a respective plurality of angle ranges; and
analyzing the angle-related signal strength data associated with at least one of the range candidates to produce said reduced set of range candidates that are consistent with one or more potential reflecting landmark positions.

44. (New) The system of claim 32,
the at least one program module including instructions for:
repeating the transmitting and receiving a plurality of times;
combining the resulting return signals to produce a representative return signal; and
processing the representative return signal to produce a set of range candidates that are consistent with one or more potential reflecting landmark positions.